

# Building with Earth in Karatu Tanzania

[BricksForLife.org](http://BricksForLife.org)  
Navarro Architects





*Ramasseum – Adobe  
Egypt, ±1300 BC*



*Al dir'iya, Sa'd Palace – Adobe  
Saudi Arabia*



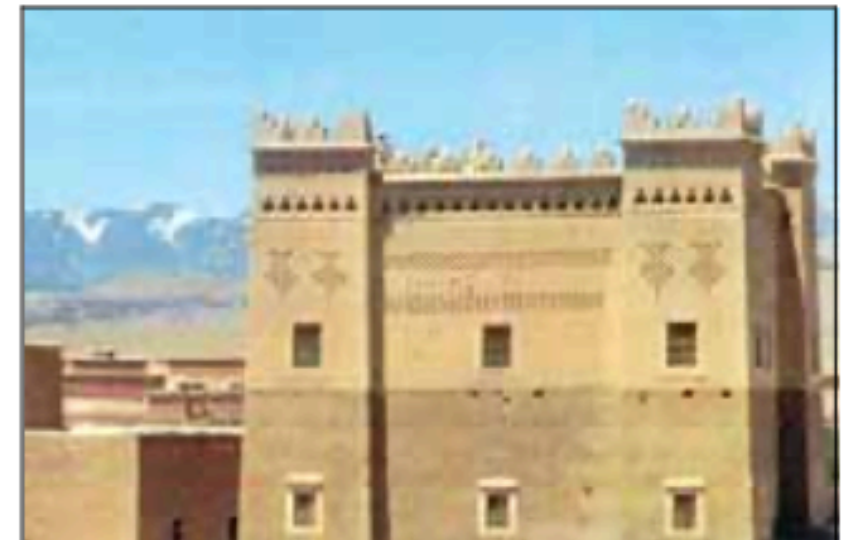
*Najran palace – Cob  
Saudi Arabia*



*Mari – Adobe  
Syria, Founded ± 2800 BC*



*Shibam – Adobe and cob  
Yemen, World site heritage*



*Ksar villages – Rammed earth  
Dades valley, Morocco*



*Tabo monastery – Adobe  
India, 996 AD*



*Rebkung monastery– Rammed earth  
Amdo, Tibet*



*Chateau of Reyrieux – Rammed earth  
France, XVIII<sup>th</sup> century*





# COMPRESSED STABILIZED EARTH BLOCK CSEB

## **A local material**

Made on the site itself or in the nearby area. Thus, it will save transportation, fuel, time and money.

## **A bio-degradable material**

CSEB will come back to our Mother Earth... No other building material can do that.

## **Limiting deforestation**

Firewood is not needed to produce CSEB. This will save forests.

## **Management of resources**

Each quarry should be planned for various utilizations: water harvesting pond, wastewater treatment, reservoirs.

## **Energy efficiency and eco friendliness**

The pollution emission will also be 2.4 to 7.8 times less than fired bricks.

## **Cost efficiency**

Produced locally, with a natural resource and semi skilled labour, almost without transport

## **An adapted material**

Being produced locally it is easily adapted to various needs: technical, social, cultural habits.

## **A transferable technology**

It is a simple technology requiring semi skills, easy to get. Simple villagers will be able to learn how to do it in a few weeks.



# COMPRESSED STABILIZED EARTH BLOCK CSEB

## **A job creation opportunity**

CSEB allows unskilled and unemployed people to learn a skill, get a job and rise in the social scale.

## **Market opportunity**

According to the local context (materials, labour, equipment, etc.) the final price will be cheaper than fired bricks.

## **Reducing imports**

Produced locally by semi skilled people, no need to import from far away expensive materials

## **Flexible production scale**

Equipment for CSEB is available from manual to motorized tools ranging from village to semi industry scale.

## **Social acceptance**

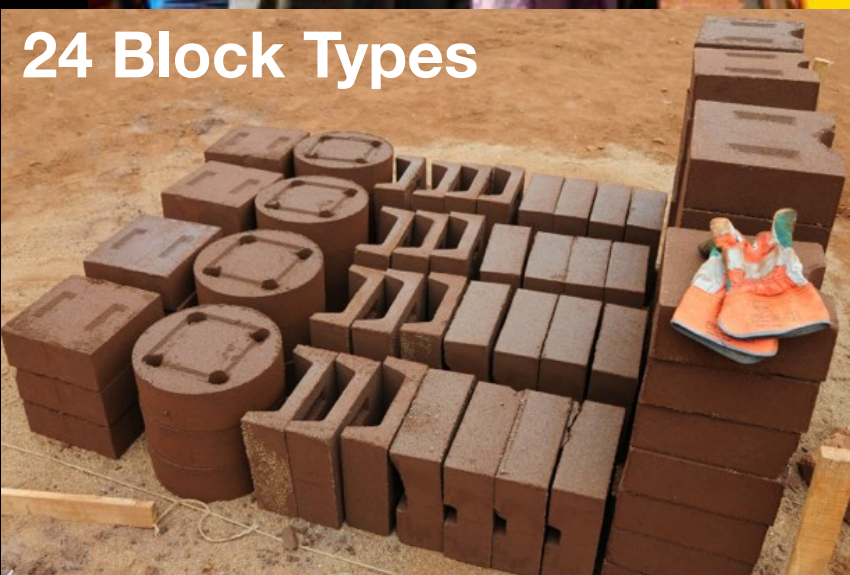
CSEB can adapt itself to various needs, from poor income groups to well off people or government needs. Its quality, regularity and style allow a wide range of final house products.





# CSEB in KARATU

## Ganako Training Course 2009







# CSEB in KARATU

**STEEL REINFORCED EARTHQUAKE RESISTANT BUILDING**

**Rosa and Paco Navarro Library 2010**







# CSEB in KARATU

**INTERIOR OF LIBRARY WITH CONCRETE SHELL ROOF ARCHES SUPPORTED**







# CSEB in KARATU OUTCOME

**OVER 100.000 BLOCKS PRODUCED**

**24 BLOCK MAKERS TRAINED**

**50 MASONS TRAINED ON CSEB CONSTRUCTION**

**Mlimani Secondary**



**Ganako Library**







# CSEB in Gyekrum Lambo START 2020

**2 AURAM 3000 PRESSES READY TO MAKE 1000 BLOCKS PER DAY**



**First production blocks**



**The Team**





# CSEB in AFRICA

## Schools Architecture







# CSEB in AFRICA

## Schools Architecture







MALI

# CSEB in AFRICA

## Schools Architecture







BURKINA FASO

# CSEB in AFRICA

## Schools Architecture







# Gyekrum Lambo Secondary Girls Dormitory

## Why?

Girls drop out rate there is over 75% percent by their 3rd year of school. This is due to various factors, including the long distance they must travel every day to school. Studies have shown extreme differences in retention rates and higher performance rates of girls who stay in School Dormitory facilities during the week.

## How?

Community Participation and Ownership of the Project.  
Voluntary labour in Construction.  
Supply of local materials, such as soil, sand, muram...  
CSEB made on school site. 14 jobs.

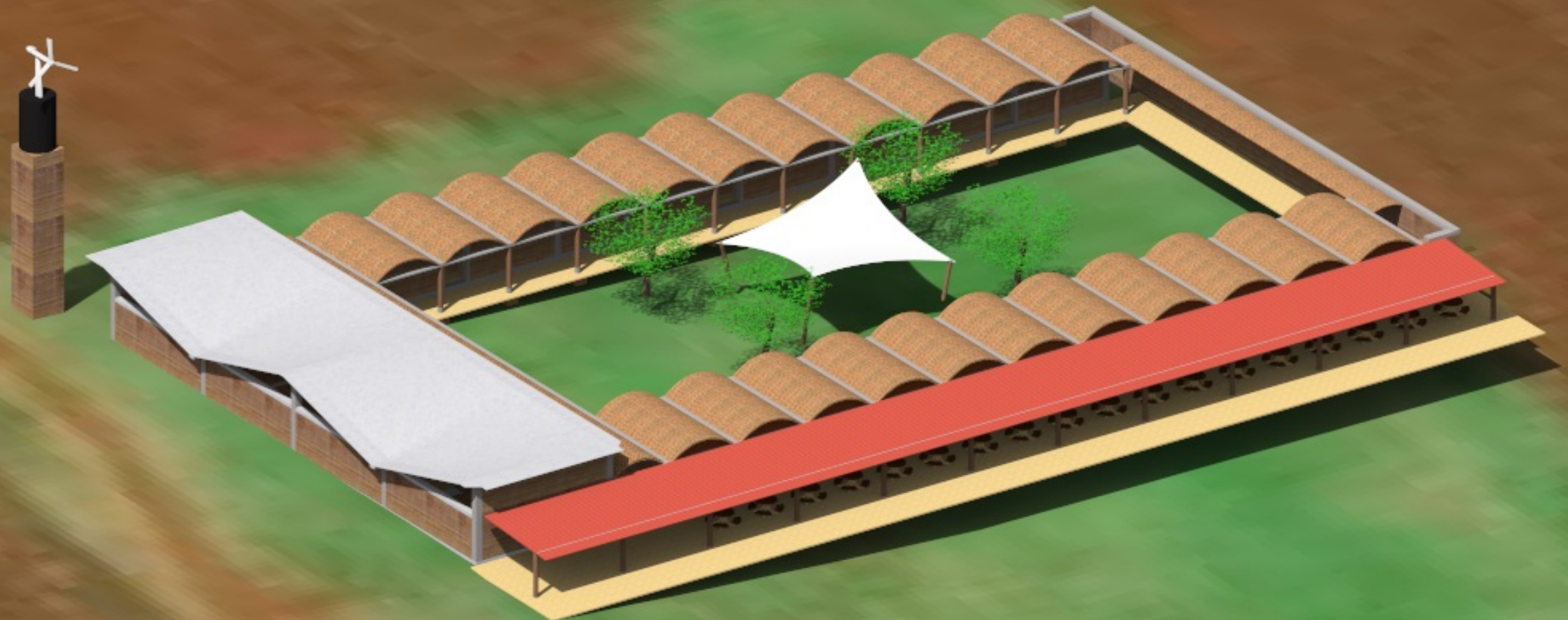
## What?

A building that will introduce the community to more economical buildings with training in construction technology, applicable to housing renewal.





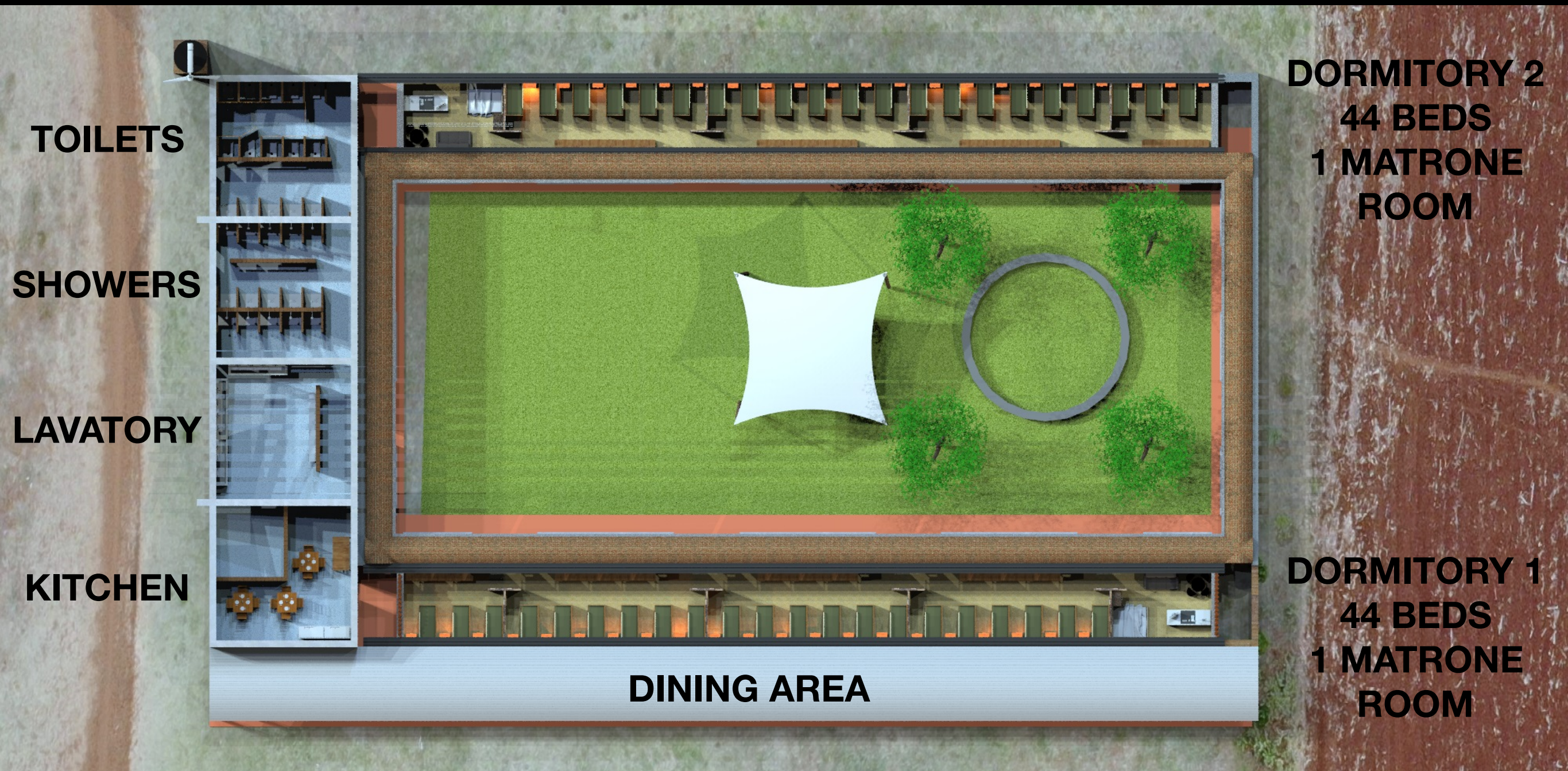
# Gyekrum Lambo Secondary The Dormitory







# Girls Dormitory Distribution







# Girls Dormitory Kitchen

**Rammed Stabilized Earth Walls 40cm wide**



**CSEB Blocks for Inside Walls**





# Girls Dormitory Verandah and Court



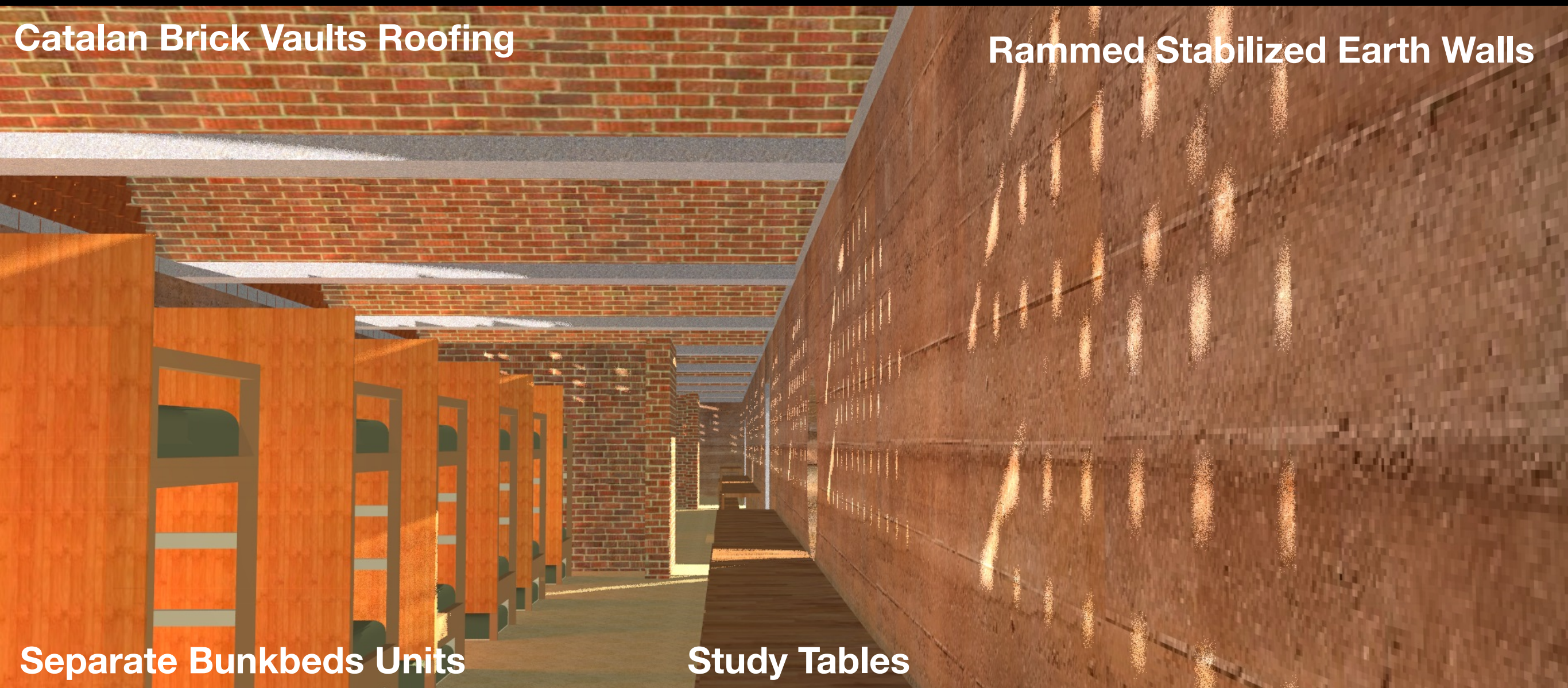
**Circle Bench for  
Outdoors Lessons**





# Girls Dormitory

## Interior with Beds and Desks



Catalan Brick Vaults Roofing

Rammed Stabilized Earth Walls

Separate Bunkbeds Units

Study Tables





# Girls Dormitory

## Lavatory, Showers and Toilets







# Girls Dormitory

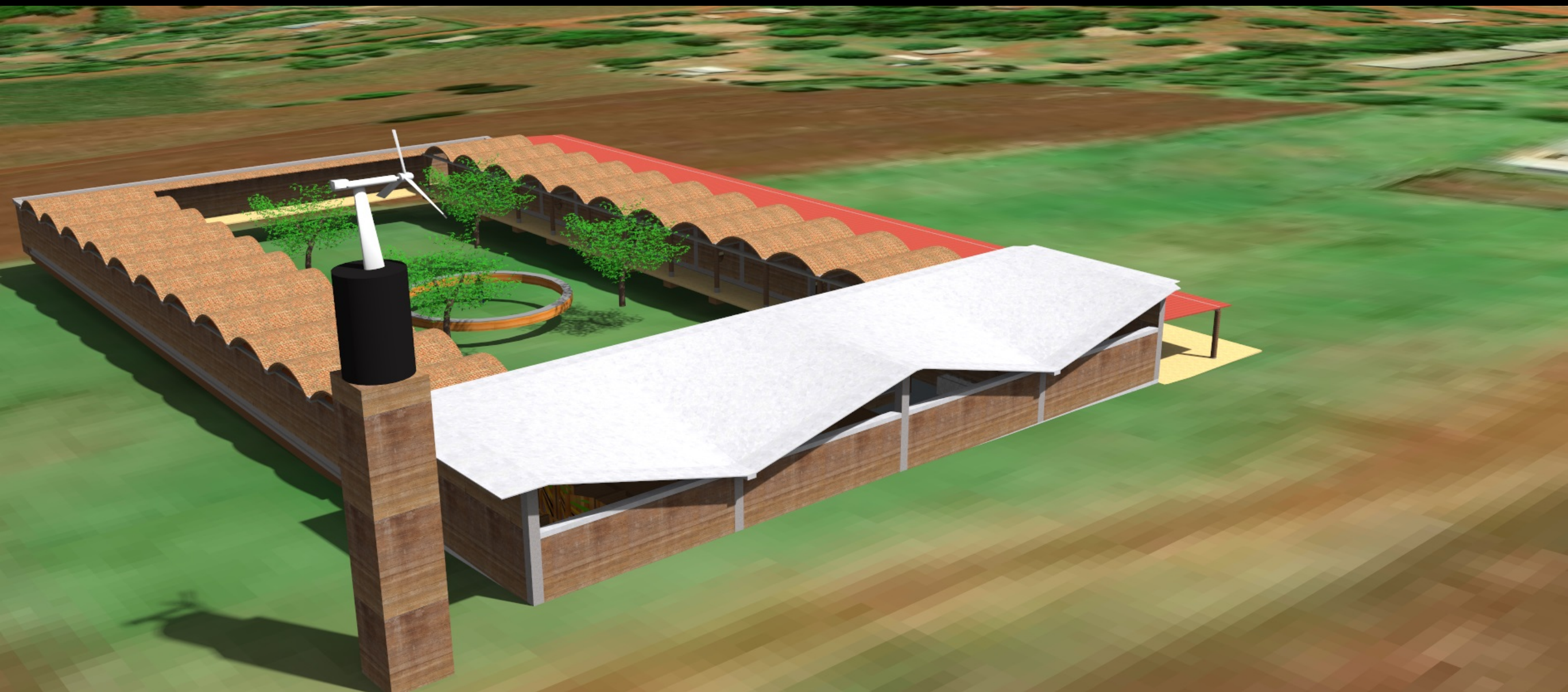
## Kitchen and Dining area







# Girls Dormitory Overview and Water Tower







# Gyekrum Lambo Secondary Community Ownership



**Villages Volunteers digging for clay soil  
for CSEB production**

**Parents bringing soil to Presses site**







# Gyekrum Lambo Secondary Construction Technology

**Rammed Stabilized Reinforced Earth Walls**



**Compressed Stabilized Earth Blocks**





# Gyekrum Lambo Secondary Construction Technology

## Catalan Brick Vaults







# Construction Technology

## Catalan Brick Vaults

**SOUTH AFRICA**



**SPAIN**







INDIA SCHOOL LIBRARY

Catalan Brick Vaults







# Catalan Brick Vaults

**SOUTH AFRICA**







# Gyekrum Lambo Secondary Construction Technology

**Hypar Concrete Shell Roofing - Ganako Library**







# The Outcome

**RAMMED EARTH WALLS**

**Better Economical Housing  
GHANA**







# The Outcome

**RAMMED EARTH WALLS**

**Better Economical Housing  
GHANA**







# The Outcome

**RAMMED EARTH WALLS**

**Better Economical Housing  
LUANDA**



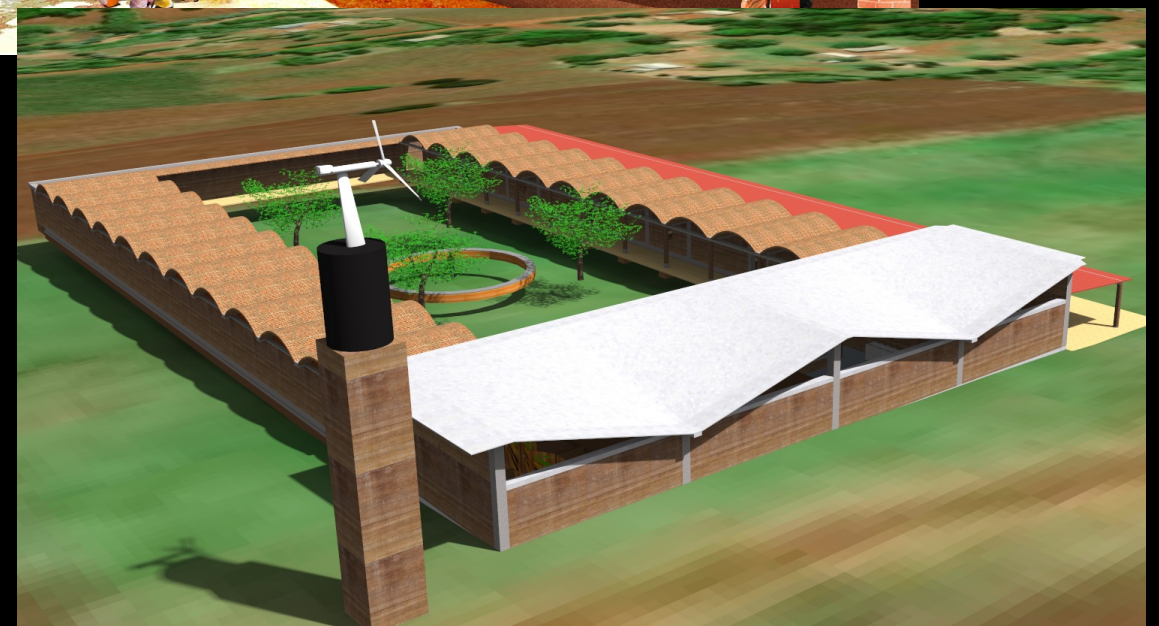




# Gyekrum Lambo Secondary

## The Outcome

**Better School Environments**







# Gyekrum Lambo Secondary Girls Dormitory How to Help?

## Participate?

You can participate in different ways with your creativity and knowledge. Engineering, construction, carpentry, sanitation, accounting, publicity.

You can also become a Fundraiser for the project!

## Donate?

100% of donations funds go to the project.

We are volunteers. Donations can be made to Karatu Education Fund at [www.karatu-edfund.org](http://www.karatu-edfund.org)



@BricksforlifeKaratuTanzanie



Choose: Karatu Education Fund

